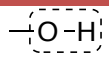
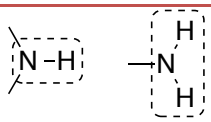
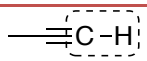
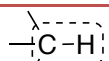
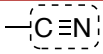
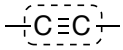
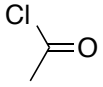
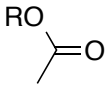
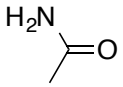
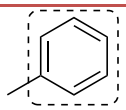
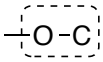
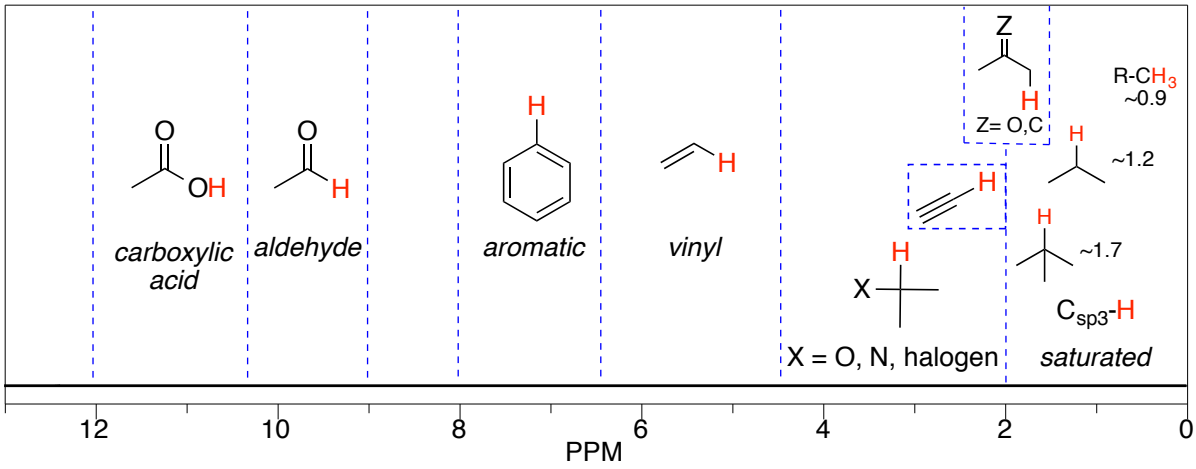
Characteristic Infrared Absorption Frequencies

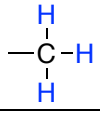
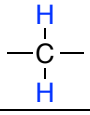
Structural Unit	Wavenumber, cm^{-1}	Special Features
	**3200-3600 (s, br)**	
	**3300-3500 (m)**	R_2N-H = one IR stretch RNH_2 = two IR stretches
	**~3300 (s)**	
	**2850-2960 (m)**	Look for C_{sp3}—H stretches just below 3000 cm^{-1} H-C-H bending just above 1400 cm^{-1} -CH_3 bending just below ~1400 cm^{-1}
	**3000-3100 (m)**	Look for C_{sp2}-H stretches just above 3000 cm^{-1}
	**2200-2300 (s)**	
	**~2150 (v)**	
Carbonyl Groups 	**1650-1850 (s)**	Variable depending on the carbonyl functionality (see below)
	**1750-1850**	
	**1700-1750**	Also look for strong Csp^2—O stretch between 1200 and 1300 cm^{-1}
	**1720-1740**	Also look for aldehyde C—H stretches at ~2720 and ~2820 cm^{-1}
	**1680-1750**	Generally around 1720 cm^{-1}; Decreased when in conjugation
	**1650-1700**	
	**1600-1700 (v)**	
	**1450-1600 (v)**	Look for 2 or 3 peaks in this region generally at ~1600, ~1500, and <1500 cm^{-1}
	**Csp^3—O: 1000-1100 (m)** **Csp^2—O: 1200-1300 (s)**	

Absorption strength abbreviations: s = strong, m = medium, w = weak, v = variable

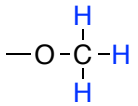
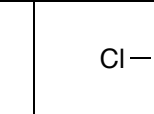
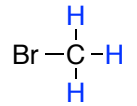
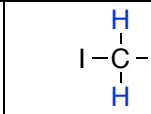
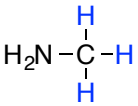
Proton NMR Chemical Shift Regions



Representative Values for the Saturated Region

Methyl	Methylene	Methine
		
~0.9 ppm	~1.2 ppm	~1.7 ppm

Representative Values – Neighboring Electronegative Atom

				
~3.4 ppm	3.1 ppm	2.7 ppm	2.2 ppm	2.4 ppm

Carbon-13 NMR Chemical Shift Regions